

CLAIMS

What is claimed is:

1. A position reference beacon for an integrated circuit, comprising:
a device capable of emitting radiation and disposed at a reference location on the integrated circuit, wherein the device is capable of being controlled independent of integrated circuit operations.
2. The beacon of claim 1, further comprising:
a control circuit connected to the device and configured to selectively enable the device to emit radiation.
3. The beacon of claim 2, wherein the control circuit is responsive to a signal external to the integrated circuit.
4. The beacon of claim 1, wherein the device is a field-effect transistor (FET) that emits photons when the FET experiences a hot carrier event.
5. The beacon of claim 1, wherein the device is a light-emitting diode.
6. The beacon of claim 11, wherein the device is a diode.
7. The beacon of claim 11, wherein the device is a quantum dot.
8. A method for identifying a location of interest on an integrated circuit, comprising:
providing at least one beacon capable of emitting radiation, positioned at a reference location on the integrated circuit and capable of being controlled independent of the normal operation of the integrated circuit.
9. The method of claim 8, further comprising:
causing one or more of the at least one beacon to emit radiation.

10. The method of claim 9, wherein the causing one or more of the at least one beacon to emit radiation comprises:

for each of the one or more of the at least one beacon, applying voltages to a device to increase a likelihood that the device experiences a hot carrier effect.

11. The method of claim 8, further comprising:

detecting radiation emitted by at least one of the one or more beacons.

12. The method of claim 8, further comprising:

for at least one beacon that produces detected radiation, identifying the reference location that corresponds to that beacon.

13. The method of claim 12, further comprising:

using at least one identified reference location to identify the location of interest on the integrated circuit.

14. The method of claim 13, wherein the using at least one identified reference location comprises:

using information about a position of the location of interest, relative to the at least one identified reference location, to identify the location of interest on the integrated circuit.

15. The method of claim 13, wherein the using at least one identified reference location to identify the location of interest comprises:

providing coordinates of the location of interest.

16. The method of claim 13, wherein the using at least one identified reference location to identify the location of interest comprises:

providing information about a circuit located at the location of interest.

17. The method of claim 8, further comprising:

using the reference location that corresponds to at least one beacon to register an image window of an integrated circuit diagnostic tool.

18. The method of claim 17, wherein the integrated circuit diagnostic tool is a light emission microscopy system.
19. A method for identifying a location on an integrated circuit, comprising:
causing at least one beacon on the integrated circuit to emit radiation; and
registering information about locations of interest on the integrated circuit with a location of at least one beacon.
20. The method of claim 19, further comprising:
detecting radiation emitted by at least one of the at least one beacon.
21. The method of claim 19, further comprising:
detecting radiation emitted by circuits of interest in the integrated circuit.
22. The method of claim 19, further comprising:
causing the one or more beacons to cease emitting radiation.
23. A method for identifying a location on an integrated circuit, comprising:
causing one or more independently-controllable beacons on the integrated circuit to emit radiation; and
establishing a frame of reference based on a location the at least one beacon from which radiation is detected.
24. The method of claim 23, further comprising:
detecting radiation emitted by at least one of the beacons.
25. The method of claim 23, further comprising:
detecting radiation emitted by a circuit on the integrated circuit.
26. The method of claim 25, further comprising:
using the frame of reference to identify a location on the integrated circuit that is a source of the radiation emitted by the circuit.
27. The method of claim 26, further comprising:
using the identified location on the integrated circuit to identify the circuit that emitted the detected radiation.

28. The method of claim 23, further comprising:
causing the one or more beacons to cease emitting radiation.
29. The method of claim 23, further comprising:
using the frame of reference to calculate a position on the integrated circuit of a location of interest; and
detecting radiation emitted from the calculated position on the integrated circuit.
30. An integrated circuit, comprising:
at least one beacon circuit, each having at least one component capable of emitting radiation and being disabled without impacting normal operation of the integrated circuit; and
functional circuitry located on the integrated circuit at a predetermined location relative to the at least one beacon circuit.
31. The integrated circuit of claim 30, further comprising:
a control circuit, connected to the at least one beacon circuit, configured to selectively enable at least one beacon circuit.
32. The integrated circuit of claim 30, wherein, when the integrated circuit operates in a test mode, a control circuit enables at least one beacon circuit and, when the integrated circuit operates in another mode, the control circuit disables the at least one beacon circuit.
33. A position reference beacon for an integrated circuit, comprising:
means for emitting radiation upon occurrence of a hot carrier event, positioned at a corresponding reference location on the integrated circuit and capable of being disabled without impacting normal operation of the integrated circuit;
means, connected to the means for emitting radiation, for providing a voltage to the means for emitting radiation likely to cause a hot carrier event in the means for emitting radiation; and
means, connected to the means for emitting radiation, for extending duration of the hot carrier event.
34. The beacon of claim 33, further comprising:
means, connected to the means for emitting radiation, for slowing switching time of the means for emitting radiation.